DOCUMENT RESUME

ED 363 312 IR 016 431

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TITLE Moving from U.S. Mail to E-Mail.
PUB DATE 93
NOTE 9p.; In: Art, Science & Visual Literacy: Selected Readings from the Annual Conference of the International Visual Literacy Association (24th, Pittsburgh, PA, September 30-October 4, 1992); see IR 016 399.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Computer Software; Cost Effectiveness; Electronic Equipment; *Electronic Mail; *Information Dissemination; Information Networks; Input Output Devices; Privacy; *Technological Advancement; Training; *Users (Information)
IDENTIFIERS *Computer Mediated Communication; User Training

ABSTRACT

The increasing use of computer technology for sending and receiving electronic mail messages not only signifies changes in how we communicate, but also signals changes in the skills, knowledge, and practices associated with communication by mail. Some of the characteristics of electronic mail (e-mail) are considered. E-mail refers to the capacity to send and receive messages on computer networks. There are a number of benefits to e-mail, including speed of communication, the ability to communicate with many individuals simultaneously, improved receiver control and use of the message, and cost savings. Conversely, e-mail has some drawbacks, such as loss of control of the physical appearance of the message, and potential loss of privacy. To make the technology most effective, everyone in a workplace should have access to the system, and users should receive the necessary training. (Contains 8 references.) (SLD)

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Moving from U.S. Mail to E-Mail

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by
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Computer-based network communication is increasing at the rate of twenty-five percent per month--an increase which would put every single human being online within a few decades (Barlow, 1992). The dramatic increase in use of electronic mail represents a technological change with direct and indirect impact on all segments of our society. Well established electronic communities are easy to find in high-technology organizations, universities, and in the financial industry. In addition, successful networks are becoming more common in less likely places such as elementary schools, professional discussion groups, and even in restaurants (Sproull and Kiesler, 1991).

The increasing use of computer technology for sending and receiving electronic mail messages signifies changes not only in how we communicate but also signals changes in the skills, knowledge, and practices associated with communication by mail.

Since current electronic mail systems primarily consist of text-based messages, this medium relies heavily on visual (text) cues to facilitate effective information exchanges. This discussion looks at some of the characteristics of electronic communication and addresses some key questions regarding the move from U.S. mail to e-mail: What do we gain? What do we lose? And what do we need to consider to make the most effective use of this visual, text-based communication technology?

What is electronic mail?

Essentially electronic mail refers to the capacity to send and receive messages on a computer network. Electronic mail software uses computer text processing tools and computer network links to provide high-speed message processing and exchange services to persons who have "addresses" on a given computer network. E-mail differs from fixed-format numerical data in that mail software lets people use free-format natural language in their messages (Sproull and Kiesler, 1991). Early use of electronic mail services in the 1960's and 70's resulted from the development of packet-switched networking and communication protocols. This development of network technology made sending messages to remote computers possible and led to the development of computer-based communications.

The definition of electronic mail

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adopted after many months of deliberation by the Electronic Mail Association (EMA) describes the technical aspects of this process: "Electronic mail is the generic name for non-interactive communication of text, data, image or voice messages between a sender and designated recipients by systems utilizing telecommunications links" (Caswell, 1988, p. 2).

People of all levels of technical experience and expertise have readily taken to electronic mail and use this technological resource to interact with others in many diverse ways. As a tool for communications electronic mail "fits into a continuum of communication media, including the telephone, physical mail delivery systems, and even broadcast media such as radio and television" (Caswell, 1988, p. 15). In addition to this list e-mail is an alternative to face-to-face interaction. As one campus computing center expert explains, "E-mail has found its own niche in communications; it hasn't taken the place of formal letter or documentation" (Sanders, W., personal communication, September 23, 1992).

Individuals may use one or more of the following types of electronic mail systems: (1)telex (TWX or Mailgram); (2)facsimile; (3)communicating word processors and teletex; (4)computer-based message systems; (5)personal computers; (6)voice mail systems; and (7)computer conferencing systems (Caswell, 1988). Each of these different systems has its own unique set of cost and benefit features. It is beyond the scope of this article to compare the technical aspects of these systems. Instead, we will focus more on the interpersonal and visual aspects of electronic communication and how it has an impact on the way people exchange information.

What do we gain by using electronic mail?

One of the benefits most often cited by e-mail enthusiasts is that use of electronic communication technology is tremendously faster than physical mail systems which usually require one to two hours for local deliveries and a minimum of 24 hours otherwise. In contrast, electronic messages can be sent and received within minutes regardless of the geographic distance.

Additional benefits of electronic mail derive from the ways in which use of this technology enables one to receive, process, and share information in a different way. The particular indirect benefits an individual experiences relate to the user's preferences and work habits. Some of the job-related benefits of using electronic mail typically cited by frequent users include:

- Reduces telephone tag since communication can be accomplished asynchronously;

- Improves productivity gains of PCs and other office automation systems;

- Improves communications, especially when time zone differences make telephone communications difficult or impossible;

- Facilitates greater interactivity with peers and staff in work environment since instant reply or reply with text of original message facilitate quick/immediate response to messages as they are read;

- Facilitates knowledge of peer activities through on-line professional conference groups and lists.

Some additional benefits to using electronic mail relate to the capabilities provided by the "electronic mailbox." Users of electronic mail systems are typically provided with some allocation of disc space either on their own personal system or on their local network typically referred to as one's mailbox or reader or electronic "in-box." The visual listing of mail shown in Table 1 shows how electronic mailboxes provide a manipulative organization to one's messages which facilitates a quick assessment of mail by date, author, or topic.

Size of in-box. All users don't have the same size in-box for receiving and sending mail. Preliminary research on ways professionals in the field of information systems found that those with smaller sized in-boxes tended to feel more in control of their mail (Mackay, 1989) because their system limited the amount of mail received.

Functions available in mailbox. Twelve functions are available within the Mailbox of the Virginia Tech VM system: 1)Help - can provide on-line assistance with software interface; 2)Read - scrolls forward through mail items; 3)Quit - to exit the Mailbox; 4)Print - to print mail; 5)Reply to respond to a specific mail item; 6)Forward - to forward a mail message to another user; 7)ScrollUp - scrolls backward through mail list; 8) ScrollDown - scrolls forward through mail list; 9)Discard - erases a mail message; 10)SortUp - sorts mail from in ascending order by date received; 11)SortDown - sorts mail in descending order by date received; and 12)Select - identifies a mail item to be viewed. Table 1 shows these mail commands and a same listing of mail files.

Other mail systems will have different mail functions and a different user interface. The benefit to the user of electronic mail regardless of the specific mail functions available, is that the software interface provides an additional tool for processing mail before viewing it. For people who receive enormous amounts of mail such as 100 or more messages per day this ability to screen messages and make decisions about them is an extremely time saving facility (Mackay, 1989). This ability to screen and analyze mail through a mail reader or automated mail screener program may result in a person's ability to manage and process their communications with a few simple key strokes.

Unlike hard copy letters and documents, electronic messages are packets of digital information which the receiver has the ability to save or discard or reformat or change. Thus, the information receiver has ultimate control of the information and is able to manipulate the information to suit his/her own needs. Many e-mail users have developed efficient systems for categorizing and logging mail in designated electronic "folders" or "notebooks" as it is received. The ability to copy and forward messages via electronic mail has tremendous impact. A message one person receives from another individual or a group can be copied and sent to one or a thousand persons with a few simple key strokes.

Cost savings. Two economic trends are believed to have stimulated the

Table 1

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>>> MAIL 90.01.01 <<< Reviewing Your Mailbox>>>          1 of 49
====>
From:          To:          Date:  Subject:

DODL@VTVM1     LRUBERG@VTVM1    >11/30/92 information on BEV beta test

INTERCOM@RPIECS  LRUBERG@VTVM1   >11/05/92 Announcements of general interest

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/05/92 Request for assistance:  under

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/05/92 Request for assistance: Online

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92 Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92*Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92*Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92*Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92 Bangkok Conference Research

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92 Bangkok Conf:  CMC in Developi

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92 Bangkok Conference Theory

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/06/92 Verification of online identit

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/09/92*Request for assistance:  under

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/09/92*Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/09/92*Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/09/92*Request for assistance:  under

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/09/92*Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/09/92*Cheating in online courses

EDUTEL@RPIECS  LRUBERG@VTVM1    >11/09/92*Cheating in online courses

PF1=Help  PF2=Read  PF3=Quit  PF4=Print  PF5=Reply  PF6=Forward
PF7=ScrollUp PF8=ScrollDown PF9=Discard PF10=SortUp PF11=SortDown PF12=Select
```

emergence and rapid expansion of computer-based communications: declining costs of computing systems and simultaneous decline in cost of long-distance telephone calls. Economic factors have continued to motivate an increasing number of professionals from such diverse fields as law, medicine, journalism, education, and business to use electronic mail. Costs associated with computing systems continue to decline and sending messages in electronic data format is considerably faster and cheaper than alternative day-time phone call or hard copy delivery systems. It is common for employees in business, industrial, governmental and university settings to have access to a locally designed electronic mail system.

What do we lose by using electronic mail?

The electronic mail sender loses control of physical appearance of information. Since e-mail occurs in a network environment and is primarily ASCI text with standard mail header, the look of electronic mail messages is significantly determined by the requirements of the communications system. Graphics, formatting, and stylistic embellishments we use to make printed documents more appealing are usually stripped from e-mail documents. In addition, the electronic mail loses the physical aspects/personalization of communications associated with hard copy format.

Part of the impact letters and documents have is based on the quality of the paper, print, and other graphic qualities on which the message is conveyed. Electronic mail is digital information exchange and thereby transient and changeable in nature. One exception to this rule is the electronic signature. Many individuals use their signature file as a way of personalizing their e-mail message and providing some distinct visual association with their communications.

Electronic mail is protected by the Communications Privacy Act passed by congress in 1986. Passage of this law makes it a crime to enter any electronic mail system illegally. E-mail records are also covered by the same wire-tapping and subpoena laws that govern other communication services such as the telephone. However, it has been documented in many instances on campus and within U.S. government systems that it is difficult to protect electronic information. The manager of the Virginia Tech computing center advises that e-mail should not be used for sensitive or private communications.

Costs of setting up system.

The process of acquiring, installing, and designing the format and procedures for a newly formed computer-based communication system can be expensive and time consuming. In order for new users of this technology to feel comfortable using a networked e-mail system the following design goals should be met for all individual users: (1)able to connect to the network easily; (2)able to retrieve their computer files easily; and (3)able to find their electronic mail easily. Training staff persons in how to use a new electronic mail system can be expensive and time consuming (Sproull and Kiesler, 1991).

What do we need to consider to make most effective use of this technology?

While electronic mail facilitates cost-effective and fast communications, there are some problems associated with this medium which need to be recognized and addressed as new systems evolve. Frequent users of electronic mail may begin to assume that everyone is comfortable communicating online. However, access to good network technology cannot always be assumed, and even when access is not a problem, attitudes towards computer technology may play a role as well. Not everyone is comfortable with this technology, and for some the costs or technical problems associated with their situation prohibit use of e-mail. Tombaugh (1984) found in his study of electronic communications among technical experts that participants

in third world countries had significant difficulties establishing and using e-mail consistently and many of these problems were technical or equipment deficiencies which could not easily be resolved.

Connecting everyone early on with an individual work station and modem is preferable to connecting only a few through fiber optics that may take months or years to install (Sproull and Kiesler, 1991). Providing everyone with a connection for convenient access to network services gives all individuals the message that what they do counts more than what technology and a select few technology enthusiasts can do. Starting off with more simple systems which link everyone will make later upgrades to more sophisticated technologies (which usually require more technical skills) more easily accepted.

There are additional, indirect benefits of establishing computer-based communications systems which are simple and easy to use. Getting all employees connected early on provides valuable organizational experience. Electronic mail is a network technology which provides the means for people to communicate; however, it is the people using this technology who will define and redefine the nature of the online communication process. Thus, how the electronic communication process evolves depends on how individuals using the system apply the technology to meet their needs.

A large number of people using electronic mail on a regular basis do so because this service is provided through their work or via their institutional affiliation. However, starting from the very early use of e-mail described above individuals using electronic communication used this medium to send personal, informal messages as well as work-related information exchange (Sproull and Kiesler, 1991).

Diane Beals (1991) provides a summary of categories generally describing the intent of e-mail messages exchanged among a network linking first-year teachers. The teachers using this network rated how effective they felt e-mail was for different categories of tasks. These categories (describing the purpose for sending e-mail messages) are presented in ranked order from most to least common: (1)give moral and emotional support, (2)provide a broader perspective on educational issues, (3)keep in touch with friends, (4)reflect on philosophy of education, (5)exchange teaching techniques, (6)assist with classroom management issues, and (7)assist with lesson and curriculum. Thus, in this case teachers found e-mail to be a more effective tool for providing emotional support, philosophical discussion, and keeping in touch with friends than it was for assisting with lesson and curriculum planning.

Having all employees connected to a network communications system can have an impact on (1)the way employees work--independently and collectively; (2)the way employees think--people are exposed to a new resource for obtaining and exchanging information which stimulates new ideas; and (3)how people communicate. These changes are bound to stimulate changes in organizational structure and management. Inter-organizational integration of electronic communications systems can lead to increased interdependence between individuals who rely on mutually shared

and constructed information from which mutually exclusive decisions are made. Increasing use of electronic communications also leads to greater dependence on computer resources which may eventually require some tradeoffs to be made between online partners which require online support and system load performance (Hart and Estrin, 1991).

At this time e-mail is primarily text messages viewed on the screen (or selectively printed and viewed). When considering the stratification of importance of messages by the medium of exchange electronic messages are still viewed as transient, less formal messages by many. Compared with a personalized letter sent on expensive paper with a highly stylized graphic logo and high quality printed message, an e-mail message carries little weight. With a single keystroke an electronic message may be erased and may seem to have never existed.

Conclusions

Using electronic mail has already been shown to provide increased speed, accuracy, and efficiency for information exchange. This technology also provides new ways of distributing messages not before imaginable. This can be seen in the enormous popularity of discussion lists which offer online interaction on nearly any topic imaginable. Among the greatest strengths electronic mail provides is the ability to transmit messages to one or many instantaneously regardless of geographic location, position, or situation of work.

Increased speed/access to communications leads to expectations for instant response which is not always desirable or possible. Based on this preliminary analysis of the differences between electronic mail and other traditional message systems, a few recommendations are offered to electronic mail users. Keep this and all applications of technology in perspective. Remember that communications technology is constantly evolving to change the needs of the people it serves. Be on the lookout for design changes needed and areas for renegotiating communications structures.

As direct access and direct communications resolve some communication problems other dilemmas emerge. Increasing bandwidth may reintroduce some social context cues the current technology lacks, but may not resolve all problems. Some users of electronic communications complain of suffering from information overload and being unable to manage all the e-mail they receive. There is no easy solution. At present, users must choose between a broad information access which many be inundating versus a narrow controlled access which limits one's perspective on information. Ultimately electronic mail users must remember who controls the switch to turn the technology on and off.

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